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A NEW LABOR-SAVING METHOD FOR MAKING CHEDDAR CHEESE

Ralph P. Tittsler
Dairy and Meat Laboratory
Eastern Utilization Research and Development Division
Agricultural Research Service, U.S. Department of Agriculture
Washington, D.C.

A new labor-saving method for making Cheddar cheese has been developed recently in our laboratory at Beltsville, Maryland, by Homer E. Walter, Arthur M. Sadler, and Clair D. Mitchell. It is distinctly different from our "simplified short-time method" described two years ago (ARS-73-11), and it was developed on the basis of the following assumptions:

1. Labor-saving procedures and equipment for making Cheddar cheese are urgently needed to compensate for increased labor costs.

2. A saving of labor is more important than a saving of time.

3. A labor-saving method should deviate as little as possible from conventional methods.

4. A new method should consistently yield a product having the desired characteristics and quality of Cheddar cheese made by present methods.

In view of these assumptions it seemed profitable to investigate the possibility of eliminating the tedious and costly hand labor required in the present matting or cheddaring procedure. The results show that Cheddar cheese of excellent quality can be made without using the conventional procedure of matting and cheddaring the curd.

The new method has been tested repeatedly on a pilot-plant scale and seems to offer a practical means for saving much hand labor. Its final evaluation, however, must await results obtained in commercial cheese factories.

Briefly, the method is as follows: The 7-hour method of making Cheddar cheese from pasteurized milk, as described in USDA Circular No. 880, is followed, except during the period from draining the whey to milling the curd. The individual steps, temperatures, and periods of time are shown in Figure 1.

At the usual time for draining off the whey, the mixture of curd and whey is pumped by a rotary-type, positive displacement pump from the vat into a cloth-lined, perforated, stainless steel, "curd retention and matting device," which has been placed in a tank (Figure 2). The mixture is discharged at the top of the device. The curd falls to the bottom forming a layer under the whey, and most of the free air entrapped between the curd particles is released and comes to the surface of the whey. The excess whey is drained off, leaving enough in the tank to cover the curd. When pumping has been completed, the cheesecloth is folded over the curd, a perforated, top plate (follower) is placed on the covered curd, weights equal to 30 pounds per square foot are added, and the whey is drained from the tank. Whey continues to drain from the curd and the curd mats for 2 hours without being turned. Then the weights, top plate, and cheesecloth are removed, and the large block of curd is cut into about 3/4-inch slabs suitable for milling.

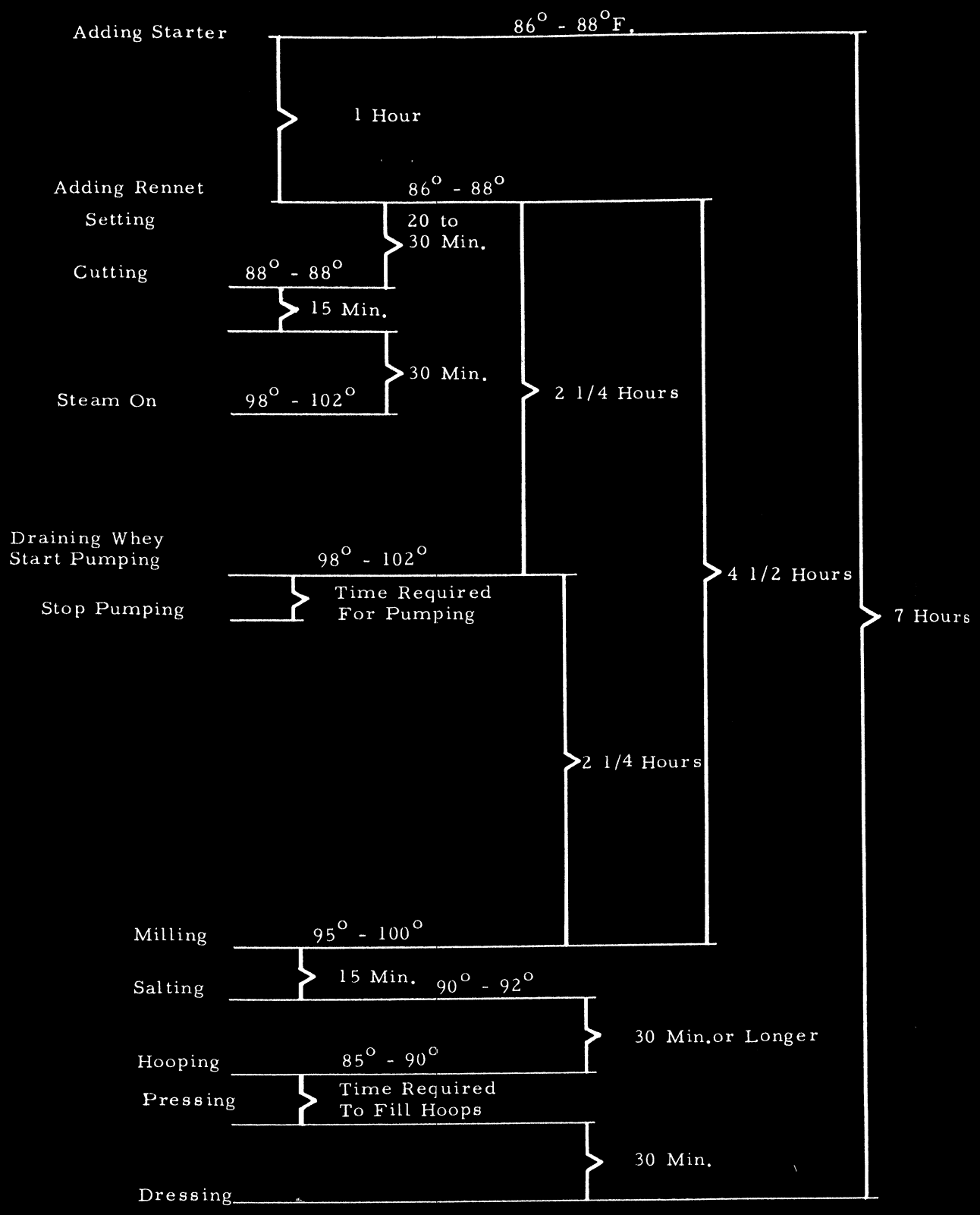
Adding Starter
86° - 88°F.
1 Hour
Adding Rennet
86° - 88°
Setting
20 to
30 Min.
Cutting
88° - 88°
15 Min.
30 Min.
Steam On
98° - 102°
2 1/4 Hours
Draining Whey
Start Pumping
98° - 102°
4 1/2 Hours
Stop Pumping
Time Required
For Pumping
7 Hours
2 1/4 Hours
Milling
95° - 100°
Salting
15 Min.
90° - 92°
30 Min.or Longer
Hooping
85° - 90°
Pressing
Time Required
To Fill Hoops
30 Min.
Dressing

Figure 1.

Conventional procedures are followed in milling, salting, hooping, dressing, and pressing the curd.

In addition to the labor-saving feature, the cheese vat is available for reuse as soon as the pumping of curd and whey has been completed.

Cheese made with this method had the same general characteristics and composition as those of cheese made with the conventional 7-hour method. It had a typical Cheddar cheese flavor, a few mechanical openings, and a firm pliable body. As it aged, the flavor became intensified and the body became smooth and waxy.

The "curd retention and matting device" was composed of three parts: a body, a bottom, and a top plate or follower (Figure 2). The body was 22 x 45 7/8 inches inside and 23 inches high. It was perforated with five rows of 1/4-inch circular holes, located every 2 1/2 inches on center, throughout the lower half. The bottom was 21 7/8 x 45 6/8 inches inside and 1 inch high. It was perforated throughout and was attached to the body with thumb screws. The top plate was 21 7/8 x 45 6/8 inches and was also perforated throughout. All pieces were made of stainless steel. This device was large enough to hold the curd from 4,000 pounds of milk. A much smaller, but similar, device was also used satisfactorily in part of the work. The tanks were slightly larger than the matting devices, and they were deep enough to insure complete coverage of the curd with whey throughout the pumping period. Further research and the commercial use of curd retention and matting devices may indicate a more desirable size and shape than described here. Also hydraulic pressure would be employed instead of weights.

The results obtained with this method on a pilot-plant scale have been exceedingly promising. In addition to its obvious labor-saving advantage, the new procedure can be carried out under controlled conditions, and it should yield a uniform product. Its actual worth, however, depends on results obtained in commercial cheese factories.

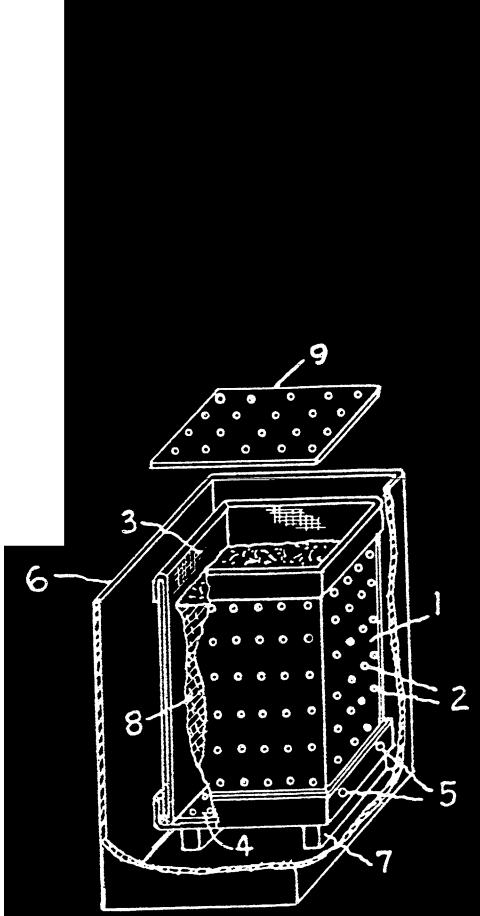

Fig. 2A

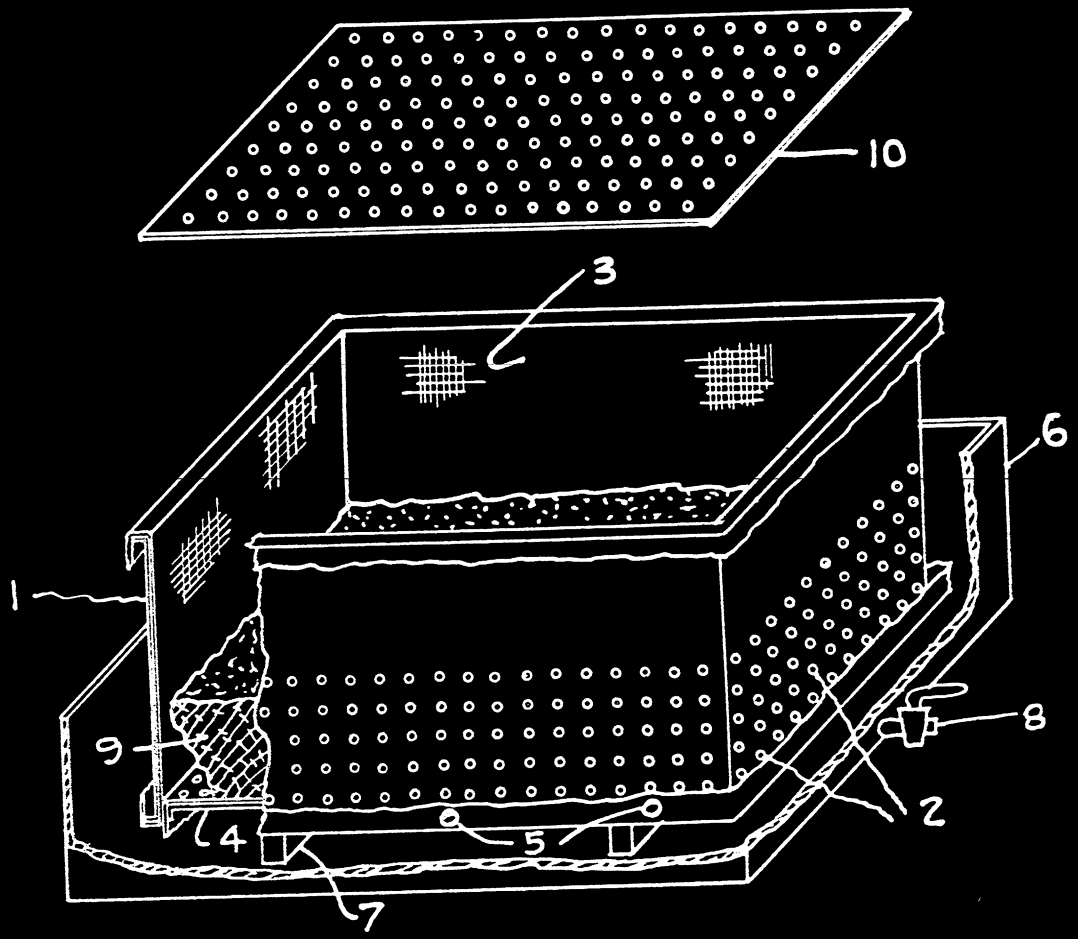

Fig. 2B